ROAD EFFECTS
of existing alignment in Ninepipe

ROAD - EFFECT ZONE
DEFINED BY ECOLOGICAL EFFECTS EXTENDING DIFFERENT DISTANCES FROM A ROAD. MOST DISTANCES ARE BASED ON SPECIFIC STUDIES (FORMAN, 1995).

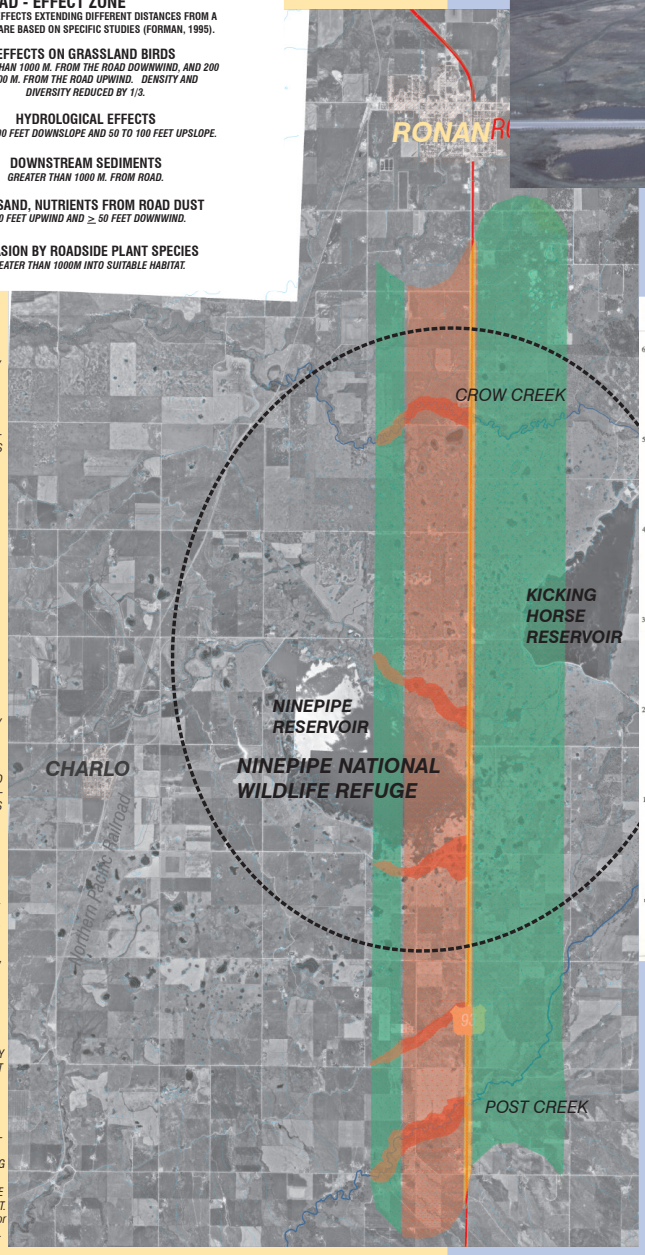
EFFECTS ON GRASSLAND BIRDS
GREATER THAN 1000 M. FROM THE ROAD DOWNWIND, AND 200 TO 1000 M. FROM THE ROAD UPWIND. DENSITY AND DIVERSITY REDUCED BY 1/3.

HYDROLOGICAL EFFECTS
200 TO 1000 FEET DOWNSLOPE AND 50 TO 100 FEET UPSLOPE.

DOWNSTREAM SEDIMENTS
GREATER THAN 1000 M. FROM ROAD.

SILT, SAND, NUTRIENTS FROM ROAD DUST
>50 FEET UPWIND AND ≥ 50 FEET DOWNWIND.

INVASION BY ROADSIDE PLANT SPECIES
GREATER THAN 1000M INTO SUITABLE HABITAT.



THE ROAD-EFFECT ZONE NOT ONLY VARIES IN WIDTH ALONG A ROAD, BUT ALSO EXHIBITS HIGHLY CONVOLUTED MARGINS. FURTHERMORE, AT ANY GIVEN POINT THE ROAD-EFFECT ZONE IS USUALLY ASYMMETRIC WITH SIGNIFICANT ECOLOGICAL IMPACTS EXTENDING FURTHER ON ONE SIDE THAN ON THE OTHER. THREE EXTRINSIC FACTORS DETERMINE THE DEGREE OF ASYMMETRY. TOPOGRAPHY, WITH UPSLOPE-DOWNSLOPE DIFFERENCES, PRIMARILY AFFECTS HYDROLOGY AND WATER-TRANSPORTED MATERIALS. WIND DIRECTION, WITH UPWIND-DOWNWIND DIFFERENCES, MAINLY AFFECTS WIND-TRANSPORTED ITEMS, INCLUDING PARTICULATE MATTER AND TRAFFIC NOISE. FINALLY, THE SURROUNDING HABITAT COMMONLY DIFFERS IN QUALITY OR SUITABILITY ON OPPOSITE SIDES OF A ROAD. THIS DIFFERENCE PRINCIPALLY AFFECTS THE SPREAD OF SPECIES, SUCH AS INVASIVE ROADSIDE PLANTS, AS WELL AS HUMANS THAT ENTER THE MATRIX AND CAUSE DISTURBANCE. - Forman, R.T. 1999. Horizontal Processes, Roads, Suburbs, Societal Objectives, and Landscape Ecology. In: Landscape Ecological Analysis, Issues and Applications, pp. 35-53. Klopatek and Gardner (eds.), Springer-Verlag, New York, Inc.

THE ECOLOGICAL EFFECT OF ROAD AVOIDANCE CAUSED BY TRAFFIC DISTURBANCE IS PROBABLY MUCH GREATER THAN THAT OF ROADKILLS SEEN SPLATTERED ALONG THE ROAD. TRAFFIC NOISE SEEMS MOST IMPORTANT, ALTHOUGH VISUAL DISTURBANCE, POLLUTANTS, AND PREDATORS MOVING ALONG A ROAD ARE ALTERNATIVE HYPOTHESIS AS THE CAUSE OF AVOIDANCE. Forman, R.T. 1999. Roads and Their Major Ecological Effects. In Annu. Rev. Ecol. Syst. 29:207-31.

GRAPHIC: Fowle, S., 1996, Effects of Roadkill Mortality on the Western Painted Turtle (Chrysemys picta bellii) in the Mission Valley, Western Montana, Article in Transportation and Wildlife: Reducing Wildlife Mortality and Improving Wildlife Passageways Across Transportation Corridors, April 30 - May 2, 1996.

National Wetland Inventory and Turtle Mortality Along Highway 93

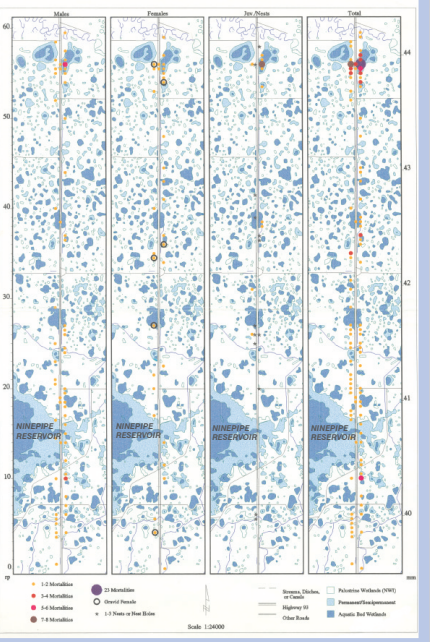


Photo courtesy of: Mary Price, CSKT Natural Resources and Dale Becker, CSKT Wildlife Management Program

US 93 DESIGN DISCUSSIONS

Project Committee:
Montana Department of Transportation
Federal Highway Administration
The Confederated Salish & Kootenai Tribes of the Flathead Nation

Evaro to Polson, Montana

Prime Consultant: Skillings-Connolly, Inc. - Consulting Engineers

December 20, 2000

J O N E S

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Architects & Landscape Architects

The existing alignment of US 93 through Ninepipe has resulted in significant adverse ecological and cultural impacts. Although the road corridor is only a couple of hundred feet wide, the road-effect zone, which defines the ecological effects to wildlife and the environment, is more than a thousand meters wide. The graphic also presents current research on turtle mortality in the area.